TENNESSEE VALLEY AUTHORITY

U. S. ENVIRONMENTAL PROTECTION AGENCY

TENNESSEE DEPARTMENT OF ENVIRONMENT & CONSERVATION

QUARTERLY PUBLIC MEETING

AUGUST 21, 2012

ROANE COUNTY HIGH SCHOOL

KINGSTON, TENNESSEE

APPEARANCES:

CRAIG ZELLER, EPA

KATHERINE NASH, TVA

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KATHERINE NASH: My name is Katherine Nash and I am the general manager for the recovery project. I took Steve McCracken's place. He retired earlier this year. I've been with TVA for nine years and on this project since shortly after the spill occurred.

We have a great team in place. We are very vested in this project. We are here to see it until the end. Bob Deacy is still the executive with oversight responsibilities for the project. And our commitment made early on in this project to return the area to as good as or better than before is still in place.

So tonight what we're going to do is Craig Zeller with EPA is going to come up and give the briefing on the river EE/CA. There will be a question and answer session afterwards with him. Then after that, we'll have representatives from TVA, from TDEC and from EPA around the room for any questions that you guys have.

One thing I do want to point out is

the public comment period is open right now and we encourage everyone to make comments on the river EE/CA. The way that we make our decision going forward is based on your comments. So if you could take a few minutes to do that either tonight or later on during this comment period, that would be great. So with that, I'll turn it over to Craig.

CRAIG ZELLER: Good evening. I've got a loud voice. I usually don't need microphones. Thanks for coming out. My name is Craig Zeller. I'm the EPA project manager. I'm kind of based out of Atlanta. I do spend a lot of time up here in Roane County. I've been over kind of the Phase 2, Phase 3 work. Another colleague of mine you may have seen back in the years is Leo. Leo Francendese kind of handled the dredging piece. After he was done with that in about 18 months, he kind of handed over Phase 2 and Phase 3 to me.

So a couple of things before we get started, as Katherine mentioned, this

meeting is very similar to the ones we've had in the past over the last three, four years. It's slightly different in the fact that this particular meeting is required by the Superfund law that this project is being cleaned up under which is one of the reasons we have a court reporter. There needs to be -- the Superfund law states there needs to be a verbatim transcript of the proceedings of this meeting. This verbatim transcript then from this meeting then will become part of the administrative record going forward.

So at the end of this -- I've got about 30 slides. I'll try to not talk so fast, but I'll try to get through them quickly so I don't bore you too much. But after the meeting, there will be an opportunity for question and answer. If you have questions, we'll certainly entertain those questions. If you have a comment, if you would rather just make a comment, please step up, introduce yourself for the record so, again, we can

get the names down on who is speaking and who is registering these comments and they will become part of the record moving forward. So we'll try and get on with that.

Next slide, please, Michael. So what are we going to do tonight? Most of what we're going to talk about is Phase 3. It's kind of a project we call The River System, Engineering Evaluation Cost Analysis. Before we get into that, we are going to do a quick little overview of what we've done thus far, what we've been doing here for the last three and half years.

We're going to talk a lot about Phase 2, you know, what does it involve, the areas involved in the study and the type of work that went in and the ecological risk assessment work as well as our evaluation and the additional -- are there any residual human health risks.

At the end of this then we're going to kind of talk about the alternatives that we've retained to address any

identified risks for human health as well as the environment. Then at the very end we're going to try to, you know, reemphasis, if we haven't already, that your input on these alternatives, your input on our study is important to us or we wouldn't be here. Okay.

Somebody asked me before have we made up our mind what we're going to do. No. EPA has not made up their mind what we're going to do, nor has TVA nor has TDEC. We're going through a comment period. Only after we fully consider all those comments and address those comments will we come up with our selected cleanup plan.

That selected cleanup plan is not likely -- it obviously depends on how long our comment period goes. But we won't likely be up here talking about a selected cleanup plan until later this fall. If I had to guess, probably October or November.

A little bit about Phase 1. What have we done? What have we accomplished

so far? Quite a bit. The first phase was about an 18-month period, a little longer. That was the big, active dredging phase. It's where we had, you know, about half a dozen dredges in the river and pulling material out of the river and then drying that material and transporting that material to an approved landfill in Perry County, Alabama.

Over that time frame there was about 3 and a half million cubic yards removed. Once it was dried and put on trains and then weighed at the landfill, there were 414 trains that went to Perry County safely, about 4 million tons, that's the weight, you know, weight conversion. That was -- the last train went to Perry County December 1 of 2010. Most of the dredging work, the bulk of the dredging work was done right around Memorial Day of 2010 when the river was reopened for recreation and navigational use.

Shortly after Phase 1 -- the last time I guess we had a public meeting like

this for public comment and looking at alternatives, it was for the Phase 2 work. Last May or May of 2010 we were talking about alternatives to close out the cell. The remedy that was ultimately selected for Phase 2 then was to go out and dig the retraining material in these little shallow backwaters of Watts Bar, areas that we call the North Embayment and the Middle Embayment, dig that material up, get it dry and then put it back in the cell that failed back in 2008, late 2008.

But before we put it back in that cell and then close out that cell, the perimeter is being surrounded with what we call a perimeter containment wall or perimeter stabilization wall. That wall is going down in the subsurface. We call it a wall, but you're really not going to see it. Okay. It's all subsurface, anywhere from 50 to 70 feet below the ground. It's being keyed into that underlying rock to withstand any earthquake forces. So if the ground starts to shake here on the East Tennessee

fault line, it's going to resist any future failure such as happened back on December 22 of 2008. We'll talk more about where we're at in Phase 2.

Now, Phase 3 is what we're going to focus on mostly tonight. It is what to do with the residual ash that's left in this system. When Leo left and turned and kind of threw the keys to the car to me, he left us about 500,000 cubic yards of material out there. Okay. It's spread over about 200 acres. We'll talk more about more in minute.

A good chunk of that material, probably 85 percent of that material, was left in place because it was commingled or collocated with Department of Energy legacy constituents, namely cesium 137. Our landfill that we were working with at the time wasn't real keen on potentially sending low level radiation to them in Perry County, so we left it in place to study it for a couple of years. That's really all about the Phase 3 work and, you know, we tried to look at what type of

long-term risk does that material pose. So a little bit about Phase 2. Next slide, please.

So you've heard about Phase 1, 4 million tons at the landfill, 414 trains, finished May of 2010. Since that time we've been very busy. For those who live in the area, you now see that the North Embayment now has water in it and it's been declared ash free by EPA and TDEC. There was about just under a million cubic yards was pulled from the North Embayment. 865,000 cubic yards to be exact. All that material then has been stacked back in the landfill cell.

Once we got done with the North Embayment at the end of 2011, we moved more into the Middle Embayment, kind of right adjacent to the cell area. This weather has been fantastic for excavation and drying ash. We kind of call it farming ash is kind of what we're doing. We're digging up wet stuff, getting it up on the, you know, high areas and getting it tilled and getting it dried and ready

to stack back in the cell.

Middle Embayment excavation is going real well. For those of you who've been along the Swan Pond corridor and the Swan Pond Circle corridor, I'm happy to report that we're now seeing brown sediment in the Middle Embayment. Brown is good. Brown is the native stuff and that's been the goal of Phase 2 is to get everything restored into these embayments to the pre-spill bathymetry or what it looked like, what the bottom of this lake looked like before this accident occurred.

About 60 to 65 percent complete with the Middle Embayment. We've got about just under 800,000 cubic yards removed and about 400,000 we think to go. We're working it real hard. Again, the summer is, again, a real high productive season for us. Not probably going to get it done this year. I know the Middle Embayment excavation is scheduled to push into the middle of the year. We hope maybe first quarter, second quarter of next year the Middle Embayment excavation

will be done. Okay. It's starting -- we're starting to get some clean samples back. If you guys have been around that area, you're starting to see some brown dirt, so it looks pretty good.

Ash stacking. All the material we're pulling from the middle and the north is going into the central cell and the lateral expansion cell. It's being stacked, spread out in 1-foot lifts and then compacted. We've got about 1.5 million total put back in. Probably about a million or so to go. Most of that is in the central. A little over 1 million has been reconsolidated or placed back in that central cell and then the lateral expansion ash pond about 500,000 cubic yards. We're going to be stacking ash through 2013.

The perimeter wall. The largest perimeter wall of its kind in the United States when it's done. It's going to be about 60,000 linear feet. The largest wall before us was about 30,000 linear feet. So we're -- you know, it's a big

project. It's going along pretty well. We're just a little over a third of the way done on that. We've completed three sections and we're moving on to the fourth section now and we're going to be building the wall up through 2014, mid 2014.

So what we're doing now is excavating ash, stacking ash and building this wall. Once all the ash has been back in the cell, it will be closed out according to Tennessee regulations. Just kind of like a regular old coal ash would, it's going to get a drainage -- excuse me -- a liner on top, a 40-millimeter thick liner to shed rainfall and to make sure rainfall doesn't sink into it.

Once that liner goes down, we're going to have a drainage layer on top to help collect any rainwater that falls on this thing to keep it out of our landfill. Then it's going to get 2 feet of clay and topsoil, be vegetated, graded flat so it doesn't erode and then there will be a long-term monitoring program in place to make sure the landfill stays, you know, a

well-constructed landfill, that we don't get any erosion on top and that type of thing.

So we hope to kind of be wrapping up with all this stuff in 2014. I'm starting to see some of this stuff bleed into 2015. It always, you know, kind of depends on weather. But we're about probably a little over halfway on this thing. We've been at this -- our order went into effect in May of '09 and my construction schedules are running through 2014. So it's about a six-year job total.

So we've accomplished -- you know, this is kind of a before and after picture. It may be hard to see back here. Some of the big things I want to point out is you can now see this is about a 70-acre area. The North Embayment has water in it. It looks really good. This East Embayment or Lakeshore Slough has been cleaned. That was cleaned in Phase 1.

This whole area is all our various stacking areas. As you can see back in '08, the ash pond and the stilling pond

still had water in them. You can see now there's about 5 to 600,000 cubic yards of ash in there and we're actually actively stacking there.

The one thing I'm very pleased about is you're kind of starting to see some hard lines take shape out there. This Dike C was about a mile worth of work that had a big rock buttress on it to fortify it. Now, we're matching that rock buttress with a new buttress that's coming around the perimeter containment wall. You can start seeing that rock wall starting to shape and you can start now seeing where ash is going to be long term inside here and then where that Middle Embayment is going to start to form up here as we move forward.

Okay. So that was all kind of Phase 1 and Phase 2 overview. Moving into Phase 3, which again is kind of the River System Engineering Evaluation Cost Analysis. We split this study area up into about ten different reaches, all right, so we could start collecting

samples and get a handle on what was happening out there. Three different reaches in the Emory along with the reference, two different reaches in the Clinch along with the reference and then two reaches in the Tennessee along with the reference.

When I say reference, that also means, what I'm trying to say, is background. When you're conducting an eco study of this size or really any eco study, you want to compare the impacts or contamination issues with the area that's been affected and you want to compare that then to background or reference reaches that have not been affected by the contamination issue. So we had to go to areas in the Emory and the Clinch and Tennessee and find areas that have not been impacted by the ash so we can compare how the bugs and bunnies are doing in the background stations versus how the bugs and bunnies are doing in the areas potentially impacted by this ash.

There was really the mother of all

eco studies is about a $40 million investment by TVA to do this. It involved 16,000 samples and there were over close to a half a million analyses done on those 16,000 samples.

It's certainly the largest investigation I've been associated with in my 22 years at EPA and provided something of this magnitude doesn't happen again, it probably will be the largest one that I'm associated with. But it involved a lot of people besides EPA, TVA and TDEC. There was a host of other State and Federal agencies. TWRA, Oak Ridge National Lab. We were very fortunate that if this was going to happen anyplace, it kind of happened next to Oak Ridge. Some of the Oak Ridge scientists that have been studying this watershed for 30 plus years were a valuable asset to us. They know the watershed really well. We leaned on that experience and they became a very integral part of our team.

The U. S. Army Corps of Engineers, the U. S. Fish and Wildlife Service, the

U. S. Army Corps of Engineers was working for me. We had one of the nation's leading sediment transport experts that was looking at how this ash moves through the system with time. I'll talk more about that later.

In addition to all the State and Feds that were involved, there were another ten different academic institutions involved, as well. We kind of called them the non-government, the NGOs, the non-government organizations. They were kind of our third party and folks that were more interested in the academic side of this thing, not from the regulatory standpoint.

So we had Virginia Tech doing tree swallow work for us. You may have seen as you drive around the area these little tree swallow boxes. They put those boxes out. The tree swallows get in there, they lay their eggs and then we kind of come in do some rude things and take their eggs and send them to the laboratory.

University of Tennessee just down

the road was doing some raccoon work for us. A variety of -- like I said, there was ten of them. Appalachian State, Colorado State, Colorado, quite a few folks involved in this thing. So it was a major effort.

So it looked at a variety of things. It looked at nonliving organisms, what we'd call kind of the physical side of things. So we were looking at groundwater, we were looking at soils, we were looking at, you know, surface water, is the water quality of Watts Bar impacted. We were tracking ash, you know, where is this material, what was left, you know, do we know how much there is and where in the lake it may reside. We did a lot of sampling of sediment.

Then living organisms. I'll talk more about this in a second. There were about 20 different living organisms that were sampled here. We call those measurement end points. Those are things that find their way to the blender and ultimately to the laboratory. There were

six species of fish, four species of birds, three species of frogs, three species of turtles, raccoons, mayflies, snails and fish food, what we'll call algae. I'll show a slide on that later. We're going to talk about what we found here as we move forward.

Okay. From sediment water, kind of the physical, the non-biological component of this investigation. The big things we were looking for is, you know, where is this ash, where is it going, how much is there. From a groundwater standpoint, the groundwater quality underneath the impoundment, underneath the 250-acre dredge cell, we wanted to characterize that and is that groundwater contaminated.

Same thing with surface water, is surface water contamination because of this ash being in the river, is that a problem. Okay. So we've set out to -- those are kind of some of our study questions that we were shooting to answer.

Okay. Let's talk first about ash. Where is it and how much is there? After

sampling -- when we got down with the Phase 1 report or Phase 1 work, there was a report written based on all the sampling that was done. At the end of the Phase 1 work, we were estimating about 532,000 cubic yards of material was left in the system.

I just love it when the numbers add up or they work together because then we went out and did a whole different, separate study, hundreds and hundreds of samples, and we came up with a volume estimate of about 510,000 cubic yards. So those estimates are pretty good, actually. 85 percent of that volume is in the Emory River, the lower 3 and a half miles of the Emory. Not surprisingly, it's the section of the river that wasn't hit real hard with the dredges because, again, the concern over the resuspension and the commingling of the cesium 137.

About 15 percent of that is in the Clinch. All right. So the majority of the stuff is still in the Emory. We've got about 15 percent, which is about

80,000 cubic yards, that's down in that -- just below the confluence with the Clinch in that first mile and a half.

Our maximum ash deposit was around 4 to 6 feet kind of in the Emory River side. Most of this stuff was -- we're seeing a lot of this sediment mixing with ash when we send our vib recorders down. We've got a term for that and we're calling it smash. It's sediment mixed with ash. So we're not getting a lot of pure layers out there anymore. A lot of it is native sediment mixed with ash. So not a lot of what we call honey holes or, you know, big targeted areas we could go get.

Is the groundwater contaminated? As we were doing the Phase 2 work, we had a lot of questions, you know, wow, EPA, you're going to close out this landfill, what about groundwater contamination, can you answer that question for us and we said sure. So under the TDEC landfill program and the solid waste, there was dozens of monitoring wells. Wells

screening ash to monitor is this ash leaching bad stuff into the underlying groundwater.

Now, those wells were being monitored before the slide. We've kind of augmented that network and made it bigger, a little better coverage. But we're analyzing for some of the same constituents that were being analyzed under the TDEC authority.

The next slide attempts to answer is groundwater contaminated. The only thing that we've seen in exceedance out there since we've started monitoring was arsenic. Okay. The drinking water standard for arsenic is 10 parts per billion. That's 1- parts of arsenic and 1 billion parts. So it's very small.

When we first put a couple of these wells in, we had some minor exceedances of that arsenic, of that arsenic number. The red line is where you want to be below. We believe that these two isolates hits were probably because of our well construction, that we had too much

turbidity, too much, let's say, ash entrained in our groundwater sample. Once those wells stabilized and we got that formation fully developed, we now have arsenic that meets the drinking water standards. So we do not have groundwater contamination under that cell.

What that means is that if you really, really wanted to, you could install a drinking water well in your cell, in that cell out there, and take your drinking water from this area. I wouldn't recommend that. The City of Kingston water tastes really good. So, you know, this is kind of a worst case scenario that we wanted to look at to see is groundwater contaminated underneath the cell. The answer to that is no.

Next question, surface water. We've been monitoring surface water out here. We have literally thousands of surface water samples that we've collected over the lifetime of this project. During dredging of course and now that we're working, you know, in the Middle

Embayment, we're also concerned about stirring up ash and releasing sludge to the Emory River.

We've been monitoring primarily for arsenic and selenium. They've been the constituents that we're interested in. And one of the things we're most interested in is in collecting samples during storm events. Everybody knows what the river looks like after it rains 3 or 4 inches, right? It gets really muddy and really murky and that's when you'd expect any resuspension or any contaminants to get up into the water calm and then transported into this system.

So we've been monitoring during storm events. This is the arsenic number. Again, the drinking water standard here is 10 parts per billion. This is drinking water. And all these dots in Watts Bar are well below that drinking water, assuming you're taking raw river water from the lake and then drinking that. We're not seeing any exceedances of the MCOs for arsenic during rainfall events to

date and don't expect to see any.

The next one is for selenium. The news on selenium is even better. We're just not seeing much selenium in this system at all. The regulatory standards we're interested in here are actually way off the chart. They're up here. These numbers are extremely low. You're less than a part per billion. So is the water during, you know, base flow events and is the water during storm events, is that bad equality water, is the surface water equality contaminated? No. The answer to that question, like ground water, is the surface water quality does not seem to be that impacted by what we're -- the system that we're looking at is not with 500,000 cubic yards of ash in there.

Another kind of anecdotal thing I'd like to kind of throw out there from surface water is that when we had a bunch of ash in the river and when we were dredging up ash, we saw quite a few times these nice plumes of floating cenospheres, these little silica bubbles that kind of

float. We've been vacuuming up cenospheres periodically. We have not had a report of cenospheres on the lake in over two years. So that leads us to believe that this material is getting buried and not getting resuspended during these storm events. So we've kind of got that anecdotal piece of evidence, but we also have the analytical chemistry on the surface water side to kind of back that up.

All right. So that's kind of the physical. Now we're going to kind of go in the biological and talk about all these things. I mentioned earlier 20 different living organisms eventually were analyzed. These six types of fish, here's our bugs, fancy term for bugs. We're going to talk a lot about bugs tonight. Fancy term that we like to use is benthic macro-invertebrates. That's a scientific term. It tends to confuse people, so we're going to be talking about bugs, bugs that dwell in sediment. Mayflies, midges, anthropods, snails.

The birds I mentioned, tree swallows boxes. Why are we interested in tree swallows? Tree swallows eat insects that come out of that mud. Okay. They're an insectivorous bird and so we would be interested in our tree swallows eating bugs that may be contaminated with ash-related constituents and then are they downloading or maternally transferring any constituents they pick up in the ash to their eggs. Okay. That's why we were grabbing eggs out of these tree swallow boxes and analyzing them.

Heron and osprey eggs, also, only one per nest. One, because we didn't want to impact the population and, two, getting heron eggs and osprey, as you might imagine, are kind of difficult. The Tennessee -- or the TVA's linemen have some pretty good equipment for that. We did use some of their cherry picker buckets and stuff to get up into these osprey egg nests.

We talked about the raccoon. There's three types of frogs and toads.

There's the American toad, the spring peeper and the upland chorus frog. Three types of turtles. That snapping turtle. Here is an example of some of our field crew collecting snapping turtles. Not real happy beasts. They really don't like to get trapped and they really don't like us to take blood samples. The turtle sampling was nonlethal. We were not killing the turtles. We are actually taking their blood and running their blood for analysis.

Then aquatic vegetation. I mentioned fish food. This is interesting. You know, besides what's growing, you know, on the shoreline and what's killing up in this emergent stuff, we were also sampling fish food. It's kind of interesting. You put out -- you know kind of that slime that develops in the bottom of your boat hull? We're doing the same thing. We set out plates of surface area, these little plates that's about, what 2 or 3 inches square. It kind of sits out there in the water calm and over time that

little slime layer develops on these plates and we pull up the plates, scrape the slime and then the slime goes to the laboratory. So you can see it was quite an involved study. I hope I've emphasized that enough.

After all of that, okay, after two years of study, $40 million and a tremendous amount of analysis and then also not just the analysis but what's it mean. You know, the trick to this is getting the data and then making it -- you know, what do you interpret from this, what are you gathering from all this information.

After all that, you know, the risk indicators that we've been focused on are arsenic and selenium. That's really what we've been tracking through this system, through all these different measurement end points. What we have left out there with this 500,000 cubic yards of ash spilled over 20 acres -- or 200 acres is a low risk to bugs that live in this material and also a low level risk to

birds that eat bugs coming out of the mud. Okay. So we have some minor issues with the bugs that are burrowing into this material and we have some minor issues associated with the birds that are eating the bugs coming out of this.

This is kind of our -- it may look like an eye chart to you sitting back there. This is kind of all the things we looked at and then what I'm looking for here is these checkmarks under Risk Management. If we see these checkmarks under Risk Management, that means CERCLA, the law that I work under, where I get my authority, now requires me to take action. So we have an eco risk trigger primarily based on the benthic invertebrates that live there and then the birds that are eating those bugs.

Now, in the laboratory we do sediment tox tests. Okay. It's the toxicity tests where we went out to eight different stations in the reservoir and collected mud and then we put the anthropod, which is a little burrowing

bug, and the midge and we subjected these critters to this various mixtures of ash to see how they survived and to see how they grew over a 10-day period and a 28-day period.

Now, for the buckets of mud that came from the lower Emory River where the bulk of this material is, those bugs performed a little differently than they did in the background stations. Now, we talked about background stations. So in the Emory River these survived and they grew, they just didn't survive as well and they just didn't grow as much as the background stations. Okay. That's what I mean.

Now, but that was in the laboratory. So it's important to look out and see what you have in the field. In the field -- hopefully you can see this. If not, we have it posted around. This top right is the actual number of bugs you're getting per square meter. Okay. Are the bugs there? Well, yes.

There actually are 2,000 bugs per

square meter in the Emory River mile where a bunch of this material is present. These boxes here are references stations, these blue boxes, and you can see we have more bugs per square meter in the Emory River reaches than we actually do in some of our references. So while they might not be performing really well in the laboratory, we go out in the field and we sample and we find the bugs. They actually are there. So they must be doing fairly well.

Now, you know, what kind of species are we getting? You talked about diversity and abundance. Abundance is total number. Diversity, how many different types of bugs are we finding. Well, in this section of the Emory River, we're actually finding 35, 40 different types of bugs. So oftentimes we do these community surveys and we will often find just the real pollution tolerant bugs. But in this case we're finding very sensitive critters, as well. So those are kind of -- that's why we do this kind of

weighed evidence. In the laboratory they suggest maybe not doing that great, but actually when we sample them in the field, they're there in the required amount of individuals as well as the diversity of species.

When we refer -- this is a fish tissue bioaccumulation slide. When we first got started with this study, there was a bunch of concern over selenium. All right. Selenium at high enough concentrations can cause reproductive impacts in fish. Okay. So that was one of the big issues, kind of the eye on the prize, keep your eye on the prize. We were really concerned and really focused in on trying to figure out if there was a selenium issue here.

The number that we've been looking for is that any time you get fish tissue concentrations over 5 parts per million in tissue, there's literature out there in previous environmental studies that suggests that's the threshold whereby you start to get reproductive impacts in fish.

But surprisingly, and it's a good surprise, after hundreds and hundreds of fish sampling, we're all well below 5 PPM in selenium and, as you can see, really not a discernable difference from reference. This is the reference concentrations here on the left and you can see here real similar from the Emory River mile, this is ERM .50 to 1.0, just above the confluence, very similar selenium concentrations or bioaccumulation happening in the study area when compared to background. So are we seeing a big impact of fish accumulation? Not really.

Okay. So that's bioaccumulation. What about the fish community? Just like the bugs where we actually can count, we take buckets of mud and you can actually count thousands of individuals and count the number of species. You can do the same thing with fish. And we were fortunate that on all of TVA's reservoirs they have a program called Vital Signs, they go out and sample all their -- you know, their watersheds and their

reservoirs on a pretty frequent cycle. Usually it's not every year for every reservoir, but they hit them pretty regularly.

So in this case we were fortunate to have what the fish community looked like before this spill happened and then how the fish community has responded after the spill. You can see this line really doesn't show a big difference. There may be a slight impairment after the spill, but really consistently since the last ten years, the fish community out there has been in the good to fair kind of classification using TVA's Vital Signs metrics. If we saw big impacts because of fish and because of that substrate down there, you would expect to see those ratings in the poor to very poor, but we're just not seeing that, either.

All right. This is kind of another looking at -- this is the number. We talked about diversity of bugs. This is also the diversity of fish, how many different types of fish are we seeing.

Just pollutant tolerant fish? Are we seeing the very sensitive species, as well? In this case, you know, if you compare the pre-spill on your left and post-spill on your right, in 2011 there's probably -- a little on the low side, 27, 28 comparatively. But you know, again, we're finding anywhere from 25 to 35 different species of fish out there. Very consistent with what we're seeing reservoir wide. So these fish, this fish community here at the Emory River stations looks a lot like the fish community in other portions of the Tennessee River. Okay. So are fish bioaccumulating this stuff? Not seeing real convincing evidence. Is the material that's in the river, is it causing an impact at the community level, are we disseminating species of fish? Not seeing that, either.

Okay. That was kind of what the eco risk assessment summary says to us. What's does the human health summary say to us? Now, there were -- before we got started on our human health risk

assessment, there were two other big studies done that stated -- the Tennessee Department of Health did a public health assessment and then there was the Oak Ridge Associated Universities' medical screening results that were done in 2010. We were -- ours was kind of an independent. The idea was to do that and see how our results matched up with what those two studies did.

What we looked at were the exposures scenarios or how people could get potentially exposed to ash. What we looked at is that somebody would be drinking water out of Watts Bar untreated as they're drinking water source. Okay. So, again, probably worst case scenario. I don't know of many people that are drinking Watts Bar Reservoir untreated, again, when we have public water supplies readily available.

We looked at fish consumption, eating about a pound a week of fish coming from the reservoir itself. Then we looked at, of course, all the recreational

scenarios. Is it okay for me to water ski? Is it okay for me to barefoot ski? Is it okay for me to swim? Is it okay for me to beach comb? As the water level drops 5 feet in the wintertime, can I walk around on the exposed sediment? Is that going to cause me any adverse impacts?

So after we ran all of those numbers based on all the sampling, what it did confirm is that before the spill there was a fish consumption advisory on this body of water because of Department of Energy legacy impacts associated with Oak Ridge. Okay. That fish advisory, that fish consumption advisory is primarily related to PCBs, or polychlorinated biphenyls, and mercury. The PCBs came from Oak Ridge. The mercury might be a likely result of atmospheric deposition. The point is that fish advisory was in place before the spill. It's not ash related. Okay. That fish advisory is in place not because of ash but because of DOE facility issues.

What we did confirm is that besides

the fish advisory issues, that we think the fish advisory should remain in effect for this body of water. Besides that, we didn't find any unacceptable risks. All right.

So our study basically confirmed what Tennessee Department of Public Health released in 2010 and also agreed with the ORAU medical screening test that was done in late '09, early 2010. From memory there was over 200 people that signed up for this voluntary kind of physical. They took blood, urinalysis and pulmonary looking at the lung function. And the results of that, their study from 210 people, also showed no presentable risk to this ash.

Now, I think we all agree, I think every epidemiologist out there and the health professionals will agree that there is a risk associated with coal ash. All right. That big risk that exists, and it's no great surprise, it is through the inhalation pathway. Okay. Breathing coal ash can and has been known to cause, you

know, some lung problems similar to asbestosis. Okay. So all our workers out there are, you know, outfitted with respirators and stuff if they need them. We are monitoring air quality routinely. We have continuous monitors on site 24-7.

We're looking at air quality and dust emissions from our Phase 2 operations. I think we've got at least six or eight water trucks that do continual laps around the site keeping that dust wet so it doesn't blow. And the air monitoring that we've been conducting shows that our systems, our engineering controls are working well.

So from a human health standpoint, we'd recommend you don't eat the fish, but other than that, recreate, enjoy the beautiful resource because I know it gets a lot of use.

Anyhow, all right, so moving forward. I've got a risk trigger I've got to address. Right? CERCLA says, okay, you've got a risk trigger for bugs and birds that eat bugs, what are you going to

do about it? All right. So we call them removal action objectives. What am I trying to accomplish with engineering technologies or engineering remedies that we can develop. Of course, I want to protect these bugs from the arsenic- and selenium-related impacts. I want to protect them and the birds that are eating those bugs and stop that transfer and potential transfer of arsenic and selenium into their eggs, et cetera.

Just like the Phase 2, we want to restore to the extent we can the ecological function of this reservoir and get it back to recreational use, you know, similar to what pre-release conditions were. So when we're done here, when EPA and TVA and TDEC are done here, we want to turn this thing back over so it's at least better -- as good or if not better than it was before the spill happened. And then any waste or any sediments or ash that we dig up and generate as a result of this cleanup or this proposed cleanups says that we have to dispose of that material

safely and in accordance with any rules and regs that might be out there.

All right. So we're going to get into the remedies. I've only got about three or four more slides, so you guys have been very attentive and I hope I'm not going through this too fast or alternatively too slow. A couple more slides about the remedies and then we'll, you know, kind of open it up for Q and A and go from there.

So the first remedy -- what I want to say is when you're dealing with sediment contamination, you really don't have a lot of tools in your toolbox. Okay. We're really looking at three and these are the same sediment alternatives that we would apply to virtually any other contaminated sediment job in the country. So the choices I have here are the choices they have for dealing with this same issue, say, in California.

The first one is a fancy term called monitored natural recovery. What it basically means is let nature do the

cleanup for you. Okay. So we're going to monitor it over a 30-year period. So this is really let nature cover this problem. It's mixing and burial of this ash that's out there with native sediments that are coming in from the Emory, coming in from the Clinch and to a lesser degree coming in from the Tennessee.

The big theory here is pretty easy to grasp. It's that as you dilute the system with cleaner sediments, you're going to decrease the percentage of ash that's out there and when you decrease the percentage of ash, you're also then going to decrease the concentrations of arsenic and selenium. So it's really a burial and mixing remedy.

We are already seeing evidence of this in our cores. As I mentioned, we're seeing smash out there, sediment mixed with ash, and we're already seeing this happen. It's a pretty flashy river and we've had 30,000 CFS events, some 70,000 CFS events which is moving material through the system.

Now, I mentioned earlier a big piece of evaluation tool that we used on this was sediment fate and transport modeling. Just like climate models and air dispersion models and groundwater plume models, you can also develop computers and arithmetic codes that can then track how this material moves through this system with time.

A guy working for me, Dr. Steve Scott, one of the nation's leading experts in sediment transport modeling, had a model set up down on a Department of Defense super computer done at Vicksburg, Mississippi where he works and it was taking about 140 hours for this model to spit out results. But what it demonstrated for us is that of course this system is net depositional. Okay.

A lake, as soon as you built a dam, we all can acknowledge that the nest thing that's going to happen is sediment is going to begin to accumulate behind that dam. Okay. So if you look at the whole Watts Bar Reservoir as a whole, you know,

it is net depositional. We're going to get about a half inch a year over the entire acreage of Watts Bar.

Now, if you look closer and more specifically at the areas that we're more interested in, at this Emory River Reach B, this would Emory River mile 3.5 to 1.5, kind of right -- kind of ground zero. The spill happened right about 2.5, 2.3. So this is kind of right in the middle of where the spill happened. We're getting a ton of sediment accumulation over the 30-year period, anywhere from 20 inches over to 60 inches. So 2 feet to 5 feet of new sediment is coming into the system and covering up our old sediment.

Now, that material kind of accumulates there in that reach, kind of a little settlement sink, kind of a little bathtub where this stuff falls out and it just kind of waits for the next big storm to push it through. When that next big storm comes to push it through, we're getting about a foot of accumulation in that lower reach of the Emory River, Emory

River mile zero to 1.5. So anywhere from 10 to 14 inches of accumulation in that area. Now, when you get below the Clinch, you know, below the confluence where the Clinch comes in, that 1 and a half miles from ERM 4.5 to 3, we're getting about 60 inches accumulation.

One of the things that the model predicted as well is that within about 10 years you're going to get to less than ash in your sediment substrate, you know, your mixture will be more native sediment than ash. And our bug surveys in the lab and our bug surveys in the field say when you get below that, that kind of magic number of 50 percent, things seem to behave kind of like they do in the background of reference stations. So we're kind of estimating here about 10 years probably of natural mixing and sedimentation before we kind of get back to looking like the reference stations.

So the title of this remedy is Monitored Natural Recovery, so that means we've got to monitor. Right? So going

forward the next two remedies I'll talk about I also will have this piece in. So the estimated annual monitoring costs on this is about $550,000 a year for 30 years. The Superfund says that I have to monitor these situations or these Superfund sites for a 30-year period. That's just kind of the law I work under.

So you'll see this term moving forward here, this net present value, and I get a lot of questions of what NPV, what does that really mean. Okay. So the remedy costs for monitor only is 10 million. Now, that money represents if I was to invest $10 million and put it in a bank account and then that bank account would earn 5 percent interest for the 30-year period, I could then withdraw money from my bank account and at the end of my 30-year period, I would have zero money left. Okay. So it's the amount of money that if invested today in 2012 dollars at 5 percent interest over 30 years, it would be the amount of money needed to pay for any upfront costs and

any monitoring costs for that 30-year period. So this $10 million you will see moving forward is incorporated in Alternative 2 and Alternative 3. All right. So that's Alternative 1.

Alternative 2 now. We're going from, say, the least costly to the mid costly to the most costly. Okay. So Alternative 2 is kind of the mid. This is the capping alternative. All right. So we've got monitored natural recovery is 1. This is the cap alternative.

People say what are you trying to accomplish with this capping alternative? This sounds crazy. What we're trying to do is minimize the exposure to the bugs. All right. We talked about this ash is kind of slightly affecting their reproduction -- excuse me -- their survival as well as their growth. So we're going to put a cap down to eliminate that exposure.

Now, putting a cap down does kill the bug. Okay. Now, we've noticed from our dredging work and other caps we've

placed at other Superfund sites around the country that bugs do come back. Okay. It usually takes 6 months to 18 months, but they do come back. But this would be then to try to minimize that exposure to the bugs that are out there.

And we want that cap to stay in place and resist erosion up to a 25-year storm event. Once you place a cap, you've got to monitor and make sure the cap stays in place and is doing the job that it's supposed to be doing.

Now, through the model I talked about they ran on the super computer, we were able to calculate what forces -- you know, when water flows over sediment it creates a sheer force and that's what moves sediment through the system. So we were able to calculate what those various forces are and what forces would move sediment and what forces wouldn't.

So we've actually got two different types of caps. For the stuff that's not so erosive, it's a smaller diameter cap that looks like pea gravel, so it would be

a quarter inch in diameter size. For the areas that are more erosion prone and get hit with pretty big storms, there would have to be a larger size material, about an inch in a diameter, to stay put. So, again, you know, we're introducing kind of a different material into the system to minimize those exposures.

Construction on this thing is one and a half to two years. It would require a two-acre dock probably down someplace on TVA's property on the peninsula. That would be needed to bring in all your capping material, get it on barges so you can then spread it.

People ask me how would you do this. Well, putting a cap down in a water body is kind of like putting fertilizer on your yard. All right. We have these things they call spreaders or broadcast spreader where actually you take your capping material, put it in a pipeline and slurry it and you kind of spray it around just like you would trying to -- like I said, trying to put down some lime on your

yard or put down some grass seed on your yard. We could also do that with a conventional excavator. You could put one of these track destinators on a barge and then you can, you know, take a scoop of the capping material and then place it over the areas to be capped.

Of course by doing all that, we'd have to monitor while we're do the capping work to make sure we're not sending big plumes of capping material into Watts Bar and then adversely impacting surface water quality during the actual installation.

We'd have to monitor that cap, of course, once it's in place long term to make sure it stays in place. So the long-term monitoring caps or the long-term monitoring for this capping alternative is about $200,000 more than the 550 I mentioned to you earlier. We add another $200,000 on there for cap monitoring and then repair of any areas that would be eroded after storm events.

Two different types of caps we designed. Alternative 2A is cap it all.

So all 200 acres out there we would cover with this cap. About 75 percent of that or 150 acres would be the pea-sized gravel, okay, and would require about 121,000 cubic yards of material to do. Then about 25 percent of that cap area would have the larger, 1-inch diameter stuff. It's about 160,000 cubic yards of total material would have to be brought in via trucks and then from the quarry and then, you know, put on barges and out to the capping area.

The net present value on 2A which is cap it all is about $45 million. 18 and a half million of that is actually to purchase cap material and to get it down. So almost half is capital costs up front. The rest of that is monitoring, project management and stuff like that.

Alternative 2B then is cap just the areas that we're calling the erosion prone areas, the areas that are more susceptible to get up and move during storm events. It's only 160 acres versus the 200. You can see the cap breakdown there. It's 110

acres with the pea-sized gravel, 50 acres total with the medium. Total present value on that is right about 39 million. From memory about 15 million of that is upfront capital costs. 15 million is purchasing the rock and getting it actually onto the lake bottom. Again, Alternative 2A also includes the 30 years of monitoring.

The third and final one, the most intrusive, the most aggressive and consequently the most expensive is dredging. This is very similar to what we did in Phase 1. We did hydraulic dredging in Phase 1, so certainly we can do it in Phase 3. It provides some big challenges which is why it wasn't done in Phase 1 and why we postponed that decision pending this $40 million study, to get an idea of, you know, really what are the human health risks from the long-term perspective and really what are the eco risks. You know, that way we can trade off the balances and does it makes sense to leave it alone or does it make since to go back and dredge

it.

It's complicated probably by probably three main things. One is that when you dredge, you're going to get resuspension. Okay. So once you hit a cutter head into this thing and start stirring up the sediment just like in Phase 1, you're going to resuspend material and there's a potential -- how little or how big, we're not certain yet -- but there is a potential that you would, you know, resuspend cesium 137 contamination and move it on down into the lake. That's a possibility.

The second complication is then disposal, what do you do with this material. Now that it's kind of got the bad rap, all right, it's low level rad or low level radiation waste, it can't go to your typical landfill. Okay. A typical landfill, I'll talk about this in a minute, loading, transportation and disposal costs are about $35 a yard. Now that this material is classified as low level rad waste, those disposal costs go

up in order of magnitude to about $350 a cubic yard. So much more expensive.

The third complicating factor is that the Department of Energy, another Federal agency, has studied the lower Clinch River system in kind of the same area that we've been studying and after all their analyses in the '95, '97 time frame, they issued a cleanup decision for the Clinch River -- which in our Emory River, Clinch River, some of the same study area -- that says their selected remedy to deal with their legacy contamination was monitored natural recovery. All right. It would be our Alternative 1. So that's what they've selected.

Now, if we were going to go down this path of dredging, we would certainly have to give a call to Oak Ridge, talk to some people in Department of Energy and say we're fixing to dredge areas of your -- you know, that are covered by your record of decision, what do y'all think about that? Okay. We've had -- they're

aware of this. You know, right now everything is very premature.

As I mentioned at the start of this talk, we haven't decided what we're going to do. The whole purpose of this meeting really is to try to get you educated up, let you know the alternatives that we are considering.

When I'm all done with this job in 2015, I'm going to go back home to Atlanta and go work on another job. And I hear this all the time at the other projects I go to, you don't have to live with it. Okay. So since you guys are going to -- you folks live here and you are going to have to live with it, we're very curious and very interested and we'd encourage you to look at the supporting information and encourage you to give me a call if you have questions. So we are very interested in what you've got to say tonight about it and through the comment period about our remedies.

Back up real quick. This thing is much more involved. In kind of, again,

one or two years we're going to need a dewatering facility, about 15 acres. Once you dredge this stuff hydraulically, it's about 90 percent water and about 10 percent solids. So you've got to get into ponds, you've got to settle that material out and then you've got to dredge that material out of the ponds and get it up on land, get it dry, get it onto trucks and get to it the landfill. So, you know, it's quite involved and it's very intrusive. The loading and transportation and disposal is, as I've mentioned, kind of a -- is complicated because of the cesium issue.

Alternative 3A dredges it all, all 440,000 acres -- or 440,000 cubic yards that are greater than 1 foot in thickness. We assumed about 80, 70 percent of that would be classified as low level rad for disposal costs of 312. We assumed about 30 percent of it was not going to be classified as low level rad, so it's got a much more reasonable disposal cost there of $35.

Dredge it all is right at about $179 million. From memory, about 110 million of that is on the loading, the transportation and disposal. So over half is on the loading -- I mean getting it out. Actually, the dredging piece itself, that includes $25 a yard and $22 a yard. The dredging itself is only 10 million bucks. I say only. That's a lot of money.

But my point is that, you know, the dredging, yeah, we could do. It's all the other complicating factors, you know, the resuspension, the loading and transportation and disposal and the existing record of decision on the Watts Bar Reservoir that creates some concerns there.

Alternative 3B is really to go more targeting. We would target 160,000 cubic yards of material that's in these shallow waters. The reason we targeted these shallow waters is that the other -- whatever, 440 minus 160, that other 300,000 cubic yards is present in deep

water environments.

Watts Bar, like other manmade reservoirs, sets up and stratifies in the summertime. So anything 15 feet or below, 20 feet below, the dissolved oxygen, right, goes to zero because they just set up. So that material that's under water where the dissolved oxygen is zero and fish can't live anyhow, we kind of said, you know, maybe it's not a big deal. So we decided to go -- you know, this is more of an optimization. If there was, you know, a desire to go out and do some more dredging, this was to go get the areas in the shallow water depths and targeted areas.

That present value on that is 83.4 million, so it's a little less than half to dredge it all up. From memory, again, about 40, 50 million of that was all loading, transportation and disposal. Again, the dredging, it's doable for a reasonable cost. It's all the other problems that lead us into those expensive numbers. All right. I think I've got one

or two more slides and then we'll open it up for questions.

So what have we been doing with community involvement. Community involvement is very important. EPA and TDEC on this want to make sure you guys have, you know, ample opportunity to understand this stuff. We're not talking rocket science, we're not talking nuclear physics, but this stuff is environmental science and some of this stuff can be rather complicated.

In working with the Roane County Community Advisory Group back in January, they suggested an idea that, you know, unlike Phase 2 where we just kind of dumped a lot of three-ring binders that were about six feet thick without a lot of guidance and help interpreting them, they suggested it would be beneficial if we tried to sponsor some kind of -- we called it kind of night school for adults.

So over a period of six weeks, we held six specific workshops, we called them. They were usually like an hour,

hour and a half. They were held over at Roane County -- Roane County State -- Roane State Community College. Excuse me. They all had different topics of the evening. Workshop 1 we kind of just gave an overview, Workshop 2 we talked about nature and extended ash, Workshop 3 was terrestrial receptors or land-based receptors, Workshop 4 was more aquatic, what was in the water, Workshop 5 was kind of all about risk assessment, and Workshop 6 was more about the engineering alternatives.

We were quite pleased. We had a really good crowd. At really all six of those, we had a crowd like similar to this. We had usually 15 to 20 people, a lot of curiosity, a lot of interest. I think they did help give people a little, you know, foundation to help dissect this stuff and interpret it.

Why we're here, that is tonight, is we're in the middle of a public comment period. We did release all these documents that support what I'm talking

about tonight. They went out on EPA's webpage and they went out on TVA's webpage that initiate a formal 30-day public comment period. So we typically like to have this meet kind of in the middle of that comment period to give you all ample opportunity to start looking at this stuff and ask any questions of the officials that are here.

You may have seen, you know, a barrage of fact sheets. We have some more fact sheets over there at our table. It's kind of like the layman's cliff notes version of what I'm talking about, what's available in thousands and thousands and thousands of pages summarized. It's kind of everything I've talked about tonight.

We're going to continue to interact with the Roane County Community Advisory Group. In fact, we have a working meeting with them set up on Thursday where we're actually going to go through this stuff perhaps in a little bit more detail and use that as an opportunity for the CAG to ask questions of EPA, TVA, and TDEC. And

if there's anything, you know, information that we can help them on, any additional information they think they may need, we're certainly going to provide that and help them, you know, get their comments compiled. That meeting will be at 6:30.

If there's other people, of course, all these CAG meetings are open to the members of the general public. You don't have to be a CAG member to attend. We would encourage you to come out Thursday. If what you see here tonight interests you, there will be a little more in detailed discussion about this two days from now.

When the comment period is all done -- right now we're set up for a 30-day comment period that started August 11th and it's going to run through Monday, September 10th. At the end of that comment period, we will sort through all these comments received and develop a response to those comments which is called a responsiveness summary. All right.

So after we get all these comments,

we will look at them and address them to the best of our ability and then we will come out with the selected remedy. All right. It will be Alternative 1, 2A, 2B, 3A or 3B.

We will come out with that document that explains that. It's called an action memorandum. This will be the third and final action memo for this property or for this site. You know, Phase 1 was dredging and Phase 2 was the cap and closure of the cell and this will be the third and final one. After we're done with the decision documents required by CERCLA, we'll be finished here. Not finished with the work. Like I say, we've still probably got about a good three years of work to do. But we expect that to come out in the fall, again, October, November.

I will say if there's anybody out there that cares for an extension, we always have the possibility, we will entertain, you know, an extension to the 30-day comment period. If people feel like they need more room or more time and

they're just not going to be able to get it done, school just started and I'm way too busy to think about ash, we do entertain those as they come in.

The statute requires me to do at least a 15-day minimum. We did extend the Phase 2 comment period. Just for your reference, I think we had an extension request from some outside environmental groups for a 90-day extension on the Phase 2 work. We split that down the middle and gave them 45. So if there are requests from the community for a comment period extension, we take those very seriously and we'll fully consider those.

So how do you get involved? Where do you submit your comments? Of course, you can do it tonight. As I mentioned, the court reporter is right here. You can ask questions or if you just simply want to put your comment on record, we encourage you to do so. That's one way to do it and get it all over with and be done. You can send them to this e-mail address and Michael Clemmons over here on

the slide show is the one picking those comments off that server page. And, again, we will get each one of those individually and respond to all those.

You can go snail mail, good old hard copy, U. S. Postal Service to that P. O. box. And all this stuff, and it is a lot of stuff, is available on TVA's webpage here, on ours, as well. It is at the public libraries on disks. And assuming that sometimes these documents are hard to pull off, we can at special request get you your own individual copies so you can look at all this stuff at your kitchen table in front of your laptop if you'd like.

So I think that is it. How did I do on time? A little long. But with that, I'm done. We're certainly here to take any questions. Just as a reminder, if you do have any questions, please introduce yourself first so our court reporter can get your name down for the record. As the questions go out, we'll address those. Certainly after the

meeting, our project team will be around to help you. You guys know how to reach me on that e-mail address right there. I'm happy to help, happy to answer any questions. It's part of my job.

So, Joni.

JONI MORGAN: Hi.

CRAIG ZELLER: Hello.

JONI MORGAN: I'm Joni Morgan and I had a couple of questions as you were going through with Alternative No. 1, the natural process. You're expecting the sediment to continue to build up over time, but don't the storm events frequently wash it down? I mean we haven't -- I've been here 25 years and I haven't seen a lot of changes in the river bottom where I live and I'm right on the river just upstream of ground zero.

CRAIG ZELLER: Yeah. There is going to be a lot of -- as I mentioned in that, there's 20 to 50 -- 20 to 60 inches of sediment in that upper reach right in front of the site. It kind of acts as a sediment sink. And as storms come in,

yes, it's going to blow that material through and it will keep moving it through.

But over a 30-year period, we are predicting net deposition for those areas, a foot right there kind of in your area. That's kind of like Lake 101. As soon as you build a lake, you know, whether it's a small pond or a reservoir the size of Watts Bar, it is going to create depositional environment. So it is net deposition. We're not --

JONI MORGAN: Very slowly and very literal, but still it's there.

CRAIG ZELLER: Right. Correct.

JONI MORGAN: Okay.

CRAIG ZELLER: So we're going to get mixing. We're already seeing mixing. So it's not just going to be one 20-foot layer -- or 20-inch layer. It's going to be mixing and the ash is going to continue to move through the system. As I mentioned, with the lack of cenosphere, it's one of the things that we view as positive is that we recognize and we

acknowledge ash is moving, sediment is moving.

But all that being said, we're not seeing cenospheres, which is good. If we had a big problem out there left in that system, we'd expect to still see cenospheres popping up. We see them in our storm water ponds on site and we are sucking them out of there. But it's a good indication that, you know, this stuff seems to be rather stable. It doesn't seem to be getting resuspended and certainly not showing up in fish tissue and the like.

JONI MORGAN: Okay. Well, I have a couple of other questions and nobody is at the microphone. So in the capping option, Alternative No. 2, are you going to have to close the river while you're installing the cap?

CRAIG ZELLER: Not widespread. You know, it wouldn't be like in Phase 1, during the dredging activity, we had so many miles of dredge pipe and I think we had five cutter head dredges. It was

dangerous. There would probably be some localized closure, I mean, around the areas that we were actively capping that day. So it wouldn't be a complete shutdown of the Emory River again. It would be more --

JONI MORGAN: There would be --

CRAIG ZELLER: Kind of like a road closure, you know. Today this section is down to two -- instead of a three-lane interstate, you might have a one-lane interstate.

JONI MORGAN: So there would still be passageway, but it wouldn't be totally closed?

CRAIG ZELLER: Correct.

JONI MORGAN: Okay. You did mention that when the cap goes down, it's going to kill off all the bugs.

CRAIG ZELLER: Yes.

JONI MORGAN: How long will it take for the bugs to come back? Do we know? And what kind of impact will that have for that period of times on the fish and the birds in the area?

CRAIG ZELLER: That's a great question. Hard to quantitatively say specifically. But usually less than a year.

JONI MORGAN: Okay. So the fish population would be somewhat down maybe --

CRAIG ZELLER: Yeah.

JONI MORGAN: -- because of the lack of bugs?

CRAIG ZELLER: Yes.

JONI MORGAN: Birds probably wouldn't be very much affected?

CRAIG ZELLER: Probably wouldn't be a community level impact.

JONI MORGAN: Okay.

CRAIG ZELLER: The capping material we're putting down is not real good substrate.

JONI MORGAN: Right. For the bugs.

CRAIG ZELLER: Bugs don't like to set up house.

JONI MORGAN: Housekeeping.

CRAIG ZELLER: They don't like to set up house in 1-inch rock.

JONI MORGAN: Right.

CRAIG ZELLER: It's just not a very hospitable environment for them. So they wouldn't come back until that new sediment moved on into the system.

JONI MORGAN: Right.

CRAIG ZELLER: So it takes more native sediment coming on to accumulate on top of that rock we put down before the bugs would come back. Any dredging remedy that we've done -- and TVA saw this themselves when they were done with Phase 1 -- it usually took six to eight months, Neal? Less than a year and the bugs come back. Same thing with the cap. We've got a lot of capping, particularly out West, and they've usually -- one growing season and they usually come back.

JONI MORGAN: Thanks.

FREDDIE STOKES: My name is Freddie Stokes. Would you mind repeating what you just said, all of it? No.

CRAIG ZELLER: The whole hour? I don't think these people want to stay here for that.

FREDDIE STOKES: No. I'm just

kidding. Is there not going to be anything done on the physical part? Like I had nose bleeds for eight months solid, you know, and I haven't heard a word from anybody.

CRAIG ZELLER: Did you sign up for the voluntary medical screening?

FREDDIE STOKES: Yeah, I did.

CRAIG ZELLER: I would probably refer you somehow to get back in touch with those folks that did that work and help them -- or they can help you with that.

FREDDIE STOKES: Well, I live where the trucks came by every day.

CRAIG ZELLER: Okay.

FREDDIE STOKES: Thank you.

CRAIG ZELLER: You bet. Any other questions or comment you want to make on the record? You guys are going to take it easy on me. I knew Don had something to say.

DON SIMON: Don Simon. Craig, you never addressed anything from mile marker 3.5 to mile marker 6. I know that you

state that the natural high water marks will wash that out. Will you look at dredging some of those areas or go back and revisit those areas that showed ash where you had clam shells, where we know some of the coves sealed it in, for instance, my area where TDEC and EPA both admitted that there was ash at the shore?

We always stop at mile marker 3 or 3.5 and address everything down river. Is that just an assumption without a revisit that everything from up river has been cleansed or will be cleansed?

CRAIG ZELLER: We can go look at that map. I think you asked that question in our workshops. From memory, I believe there's 79,000 cubic yards of material. No. It's less than that. It's more like 15,000 cubic yards of material that is in this Reach C that you're talking about. So it would get picked up with Alternative 3A.

DON SIMON: Okay. Thanks.

CRAIG ZELLER: Yep. Anybody else? Okay. Well, if you're shy and you don't

want to, you know, talk in front of all these folks and you don't want your name recorded for the court reporter, you can certainly come up and talk to us in confidence afterwards if you have anything you would like to say.

Steve, go ahead. One more here.

STEVE SCARBOROUGH: I'm Steve Scarborough. One of the questions I had is like the area that Don was talking about that's above the area that has any significance, cesium in it. So what it looks like to me is that some hybrid of these things, of some of the alternatives, might be a better alternative than any single alternative by itself. You know, are you guys open to that kind of thing if it's proposed or will you be looking at that as you go forward?

CRAIG ZELLER: We always -- that's going to be a really good comment to submit during the comment period, combining remedies or combining approaches. That's something that we would take into consideration, sure.

STEVE SCARBOROUGH: Good. Thanks.

CRAIG ZELLER: Thank you, Steve. Anybody else? Going once. Going twice. Okay. You've been a very good group. Thank you for coming out. I know you've got lots of things going on and it's busy with the start of summer here -- or start of school year. So thanks for taking your time.

(MEETING CONCLUDED.)

REPORTER'S CERTIFICATE

STATE OF TENNESSEE:
COUNTY OF HAMILTON:

I, Tracy A. Beamon, Certified Court Reporter and Notary Public, do hereby certify that I reported in machine shorthand the August 21, 2012, Proceedings in the above-styled cause; that the foregoing pages, numbered from 1 to 78, inclusive, were typed under my personal supervision and constitute a true record of said proceedings.

I further certify that I am not an attorney or counsel of any of the parties, nor a relative or employee of any attorney of counsel connected with the action, nor financially interested in the outcome of the action.

Witness my hand in the City of Chattanooga, County of Hamilton, State of Tennessee, this 9th day of September, 2012.

_____
Tracy A. Beamon, CCR-1003, LCR-466
My Commission Expires on the
18th day of February, 2015.